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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/665,496	09/22/2003	Zhiqiang Wei	0020-5179P	6865

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EXAMINER

PARKER, FREDERICK JOHN

ART UNIT	PAPER NUMBER
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1762

DATE MAILED: 05/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/665,496	Applicant(s) WEI ET AL.	
	Examiner Frederick J. Parker	Art Unit 1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 7-12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 13-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4-10-06 has been entered.
2. The Examiner acknowledges the amendment to claim 1 which limits the MO film to ONLY ONE METAL ELEMENT; consequently all previous rejections of the prior Examiner are withdrawn, and the new rejections reflect the amendments.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claim 1-3, 5,6, 13, 15 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Qiu '849 in view of Qui et al WO99/36353 (hereafter "QuiWO353")(US 6455106 which cites priority from the WO patent is used in lieu of a certified translations, and all citations are from the US patent).

Qiu '849 et al teaches a method for preparing a thin film of metal oxide containing metal elements on a substrate comprising the steps of:

applying a sol-gel solution containing metal elements, such as lead and barium (col. 9, lines 13-17; col. 16, lines 1-8) to a surface of said substrate (col. 9, lines 7-50);

drying said sol-gel solution to prepare a dried gel film on said substrate (col. 9, lines 51-67);

soaking said dried gel film on said substrate in an alkaline aqueous solution containing barium (col. 10, lines 9-22) or lead (col. 10, lines 51-64) in a container;

sealing the container (The container must be sealed in order to achieve desired super-atmospheric pressures (col. 10, lines 23-64).); and

performing hydrothermal treatment for said dried gel film on said substrate in the sealed container to prepare said thin film of metal oxide on said substrate (col. 10, lines 9-64). The hydrothermal treatment promotes crystallization of the metal containing film at lower temperatures than by conventional sintering methods.

Claims 2-3: The temperature may be 140 °C (col. 10, lines 27-28).

Claim 5: The metal may be lanthanum (Fig. 7).

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Claim 13: The steps may be repeated a plurality of times (col. 9, lines 63-67; col. 10, lines 9-64).

Claim 15: Water tank (7) is heated externally by an autoclave (col. 10, lines 9-22).

Qui '849 does not explicitly teach that the hydrothermal treatment is at 15 atm. However, it does teach 2-20 atm (col. 4, lines 49-51). The subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the overlapping portion of the range disclosed by the reference because overlapping ranges have been held to be a *prima facie* case of obviousness, see *In re Malagari*, 182 U.S.P.Q. 549.

While Qui'849 is not apparently limited to the number of metal elements in the final metal oxide film, nor does it explicitly limit the metal oxide film to contain only one metal. However, QuiWO353 teaches a similar method of forming oxide ceramic films by a sol gel method followed by hydrothermal treatment to crystallize the applied precursor film in the presence of water (col. 2, 6-10; etc). Both references cite forming similar oxide films, e.g. PZT, Pb-La Titanate, etc (compare col. 9 12-18 versus col. 7, 23-30 of the primary and secondary references, respectively). However, QuiWO353 explicitly teaches that films with only one metal, specifically zirconium oxide and so on may be made by a precursor method and then crystallized by hydrothermal treatment. It is further the Examiner's position that since Qui'849 teaches such a large variety of compositions and ionic substitutions that the formation of a single metal oxide layer, e.g. zirconia, alumina, yttria, lanthanum oxide (per claim 21), etc, would have been an obvious variation, in view of the disclosure in QuiWO353 which teaches a similar method to produce simple or complex oxide films of single or multiple metals.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to carry out the method of Qui'849 to form single metal precursor films

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given the teachings of QuiWO353 because of the expectation of forming a well-crystallized thin film of metal oxide of only one metallic element.

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Qiu '849 in view of QuiWO353, as applied to claim 1, above, and further in view of Lee et al. (U.S. Patent 5,763,092, hereafter '092).

'849 and QuiWO353 are discussed above, but does not explicitly teach boiling the alkaline aqueous solution before soaking. '849 teaches that its hydrothermal process occurs to replace atoms in the structural lattice with other desired atoms (col. 3, lines 26-61) in order to obtain a particularly desired (perovskite) crystal structure. However, '092 teaches that hydrothermal treatment solutions used to treat oxide films may be boiled in order to avoid the undesirable incorporation of carbon into the films (col. 5, lines 40-59). Therefore, taking the references as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have boiled the hydrothermal treatment solution of '849 in view of QuiWO353 before immersing the substrate in order to have avoided the incorporation of carbon into the oxide film of '849 because '849 does not desire carbon contamination in the film.

5. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Qiu '849 in view of QuiWO353, as applied to claim 1, above, and further in view of Yonezawa et al. (U.S. Patent 3,963,630, hereafter '630).

'849 and QuiWO353 are discussed above, but does not explicitly teach that the autoclave is steel. However, '630 teaches that stainless steel is an operative material for forming autoclaves for performing hydrothermal treatment of metal oxides (col. 3, lines 47-50). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used stainless steel as the autoclave material with a reasonable expectation of success and with the expectation of similar results because stainless steel is known as a suitable material for forming autoclaves for performing hydrothermal treatment of metal oxides. The selection of something based on its known suitability for its intended use has been held to support a *prima*

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facie case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

6. Claims 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Qiu '849 in view of QuiWO353, as applied to claim 1, above, and further in view of Ishizawa et al. (*Jpn. J. Appl. Phys.*, 29, pp. 2467-2472, hereafter Ishizawa).

'849 and QuiWO353 are discussed above, but does not explicitly teach equipping the autoclave with a thermocouple, nor a beaker with a removable lid. However, Ishizawa teaches an appropriate apparatus for performing hydrothermal treatments on metal oxides which use an autoclave containing a Teflon beaker (C) and a thermocouple (A) (Fig. 2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used such an apparatus as the particular apparatus of '849 with a reasonable expectation of success because Ishizawa teaches that it is an appropriate autoclave for performing hydrothermal treatments on metal oxides. The Examiner takes Official Notice that it is well known to provide removable lids for beakers in order to provide the ability to protect solutions in the beaker from contamination or to prevent spills from the beaker. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a removable lid for the beaker of Ishizawa in order to have provided the ability to protect solutions in the beaker from contamination or to prevent spills from the beaker.

7. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Qiu '849 in view of QuiWO353, as applied to claim 1, above, and further in view of Borodin et al. (U.S. Patent 5,069,744, hereafter '744).

'849 and QuiWO353 are discussed above, but does not explicitly teach that the autoclave is steel nor that it is equipped with a leak tube. However, '744 teaches that a leak tube may be provided in a hydrothermal autoclave for treating metal oxides in order to protect the walls of the autoclave from corrosion and the solution from contamination (col. 4, lines 11-26). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a leak tube in the autoclave of '849 to have minimized corrosion of the autoclave walls while protecting the solution from contamination.

8. Claims 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Qiu '849 in view of QuiWO353, as applied to claim 1, above, and further in view of Naito et al. (U.S. Patent 5,790,368, hereafter '368).

'849 and QuiWO353 are discussed above, but does not explicitly teach equipping the autoclave with a beaker with a removable lid and a substrate holder in the beaker. However, '368 teaches an appropriate apparatus for performing hydrothermal treatments on metal oxides which use an autoclave containing a fluororesin beaker and a substrate holder (Fig. 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used such an apparatus as the particular apparatus of '849 with a reasonable expectation of success because '368 teaches that it is an appropriate autoclave for performing hydrothermal treatments on metal oxides. The Examiner takes Official Notice that it is well known to provide removable lids for beakers in order to provide the ability to protect solutions in the beaker from contamination or to prevent spills from the beaker. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a removable lid for the beaker of Ishizawa in order to have provided the ability to protect solutions in the beaker from contamination or to prevent spills from the beaker.

9. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Qiu '849 in view of QuiWO353 and further in view of Ishizawa, as applied to claim 18, above, and further in view of Yonezawa '630.

'849 Ishizawa teaches that the beaker is surrounded by redistilled water (B). The emphasis on purity indicates to one of ordinary skill in the art that ions would not have been desired. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used deionized water as the redistilled water to have provided such purity. '630 renders the use of a stainless steel autoclave obvious for substantially the same reasons given regarding claim 14 above.

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Response to Amendment

This Examiner has reviewed Applicants arguments and amendments. Response is moot given the new rejections which are cited above and address the amendments and arguments.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frederick J. Parker whose telephone number is 571/ 272-1426. The examiner can normally be reached on Mon-Thur. 6:15am -3:45pm, and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on 571/272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Frederick J. Parker
Primary Examiner
Art Unit 1762

fjp